

## PATENT ABSTRACTS OF JAPAN

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### (54) LIGHTFAST YARN, LIGHTFAST CLOTH AND LIGHTFAST FIBER PRODUCT

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a silk-based fiber product equipped with an improved lightfast property, effectively preventing yellowing caused by light without damaging the excellent property of the silk fiber, and enduring its use without reducing its effect for a long period of time.

SOLUTION: This lightfast yarn is obtained by spinning with combining an artificial fiber containing a far infrared light-irradiating material with the silk fiber, preferably so as to surround the artificial fiber with the silk fiber, and the cloth produced by using the lightfast yarn and the fiber product secondarily processed by using such yarn and cloth also show the same effect.

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CLAIMS

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[Claim(s)]

[Claim 1] Light-fast yarn characterized by spinning combining the artificial fiber and silk fibre containing a far-infrared radioactivity ingredient.

[Claim 2] Light-fast yarn according to claim 1 which combines and becomes so that a silk fibre may enclose said artificial fiber.

[Claim 3] Light-fast yarn according to claim 2 which comes to carry out the piled yarn of said artificial fiber and silk fibre.

[Claim 4] Light-fast yarn according to claim 2 which spins and becomes so that a silk fibre may coil around the perimeter of said artificial fiber.

[Claim 5] Light-fast yarn according to claim 4 which has the structure of either the single covered yarn by the silk fibre which used said artificial fiber as the core, double covered yarn or cored yarn.

[Claim 6] Said artificial fiber is light-fast yarn according to claim 1 to 5 which is the gap chosen from synthetic fibers, such as semi-synthetic fibers, such as regenerated fibers, such as a rayon system and a cuprammonium rayon system, an acetate system, and a protein system, a polyvinyl alcohol system, a polyamide system, a polyvinyl chloride system, a polyester system, a polyacrylonitrile system, a polyolefine system, a polyurethane system, a phenol system, and the poly KURARU system, a kind, or fiber beyond it.

[Claim 7] Said silk fibre is light-fast yarn according to claim 1 to 6 which is the silk fibre of a domestic silkworm system or a wild silkworm system.

[Claim 8] The light-fast cloth characterized by using said light-fast yarn according to claim 1 to 7 as some ingredients at least.

[Claim 9] The light-fast cloth according to claim 8 which knit the aforementioned light-fast yarn and used it as yarn or a strand.

[Claim 10] The light-fast textiles characterized by using said light-fast yarn according to claim 1 to 7 or light-fast cloth according to claim 8 or 9 as some ingredients at least.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the light-fast textiles of the silk system which canceled the weak spot which is silk where it was easy to yellow from the former in detail about the yarn manufactured using a silk fibre and the cloth manufactured using the yarn, and the textiles which use such yarn and cloth for a list and are manufactured.

**[0002]**

**[Description of the Prior Art]** The textiles of a silk system have the special feature that it is soft and light, perspiration resistance, heat retaining property, and moistness are good, and also the features, like there is stimulative [ little / over the skin ] are improved, and the need as garments, an underwear, etc. has been increasing. However, it is known for one of these that there is a fault in which yellowing advances if exposed to the artificial lights, such as sunlight and a fluorescent lamp, and it is also known that this yellowing will be promoted by the ultraviolet rays included in such light.

**[0003]** The approach of combining with fiber the ultraviolet ray absorbent which consists of compounds, such as a hydroxy benzophenone system, a benzotriazol system, and an aziridinyl system, using an amine compound etc. in order to prevent degradation by ultraviolet rays, such as a color conventionally used for such the textiles itself and it, the fiber into which polyethylene glucosol etc. was infiltrated beforehand, the approach of making it react, etc. are proposed. However, since wash-proof nature did not bear the long-term use which is not enough or these approaches had problems, such as spoiling aesthetic property, they were not satisfying things as the ultraviolet-rays prevention approach for a silk product.

**[0004]**

**[Problem(s) to be Solved by the Invention]** Then, this invention aims at offering the textiles of the silk system equipped with the improved lightfastness which yellowing is prevented effectively, and effectiveness moreover does not fall by wash etc., and are equal to prolonged use, without spoiling the perspiration resistance which a silk fibre has, and the property of aesthetic property and others.

**[0005]**

**[Means for Solving the Problem]** The light-fast yarn characterized by spinning combining the artificial fiber and silk fibre containing a far-infrared radioactivity ingredient can attain the purpose of above this inventions.

**[0006]** And as for the light-fast yarn of this invention, it is desirable to combine and become so that a silk fibre may enclose the artificial fiber containing the aforementioned far-infrared radioactivity ingredient, to spin so that the piled yarn of an artificial fiber and the silk fibre may be carried out or a silk fibre may be twisted around the perimeter of an artificial fiber, and to have the structure of either the single covered yarn by the silk fibre which used the artificial fiber as the core, double covered yarn or cored yarn.

**[0007]** The artificial fiber in the light-fast yarn of this invention may be the gap chosen from synthetic fibers, such as semi-synthetic fibers, such as regenerated fibers, such as a rayon system and a cuprammonium rayon system, an acetate system, and a protein system, a polyvinyl alcohol system, a polyamide system, a polyvinyl chloride system, a polyester system, a polyacrylonitrile system, a polyolefine system, a polyurethane system, a phenol system, and the poly KURARU system, a kind, or fiber beyond it, and a silk fibre may be a silk fibre of a domestic silkworm system or a wild silkworm system.

**[0008]** Furthermore, the purpose of this invention knits the aforementioned light-fast yarn, is the form of yarn or a strand and can attain it at least again also with the light-fast textiles using the light-fast cloth used as some

ingredients at least and such light-fast yarn, or light-fast cloth as some ingredients.

[0009]

[Embodiment of the Invention] Although it is the gap chosen from a regenerated fiber, a semi-synthetic fiber, a synthetic fiber, etc. as mentioned above, a kind, or fiber beyond it, the artificial fiber used as an ingredient of the light-fast yarn of this invention can be used without being limited especially, if the far-infrared radioactivity ingredient is contained. And although the well-known far-infrared radioactivity ingredient indicated by the specification of the Japan patent No. 2137667 can be used, the far-infrared radioactivity ingredient which such an artificial fiber is made to contain is not necessarily limited to this, is equipped with far-infrared radioactivity similar to this, and if it is an ingredient which can be made to contain in an artificial fiber after the time of manufacture of an artificial fiber, or manufacture, it can use it.

[0010] The far-infrared radioactivity ingredient beforehand pulverized in the polymeric materials which turn into a raw material of an artificial fiber, for example in manufacturing the artificial fiber used as an ingredient of the light-fast yarn of this invention is mixed, the polymeric materials containing this far-infrared radioactivity ingredient can be extruded from a spinning nozzle, and the approach of extending the extruded strand until it becomes a required size etc. can be used. However, the approach suitable for the polymeric materials which are each raw material is used for such the spinning approach of an artificial fiber, spinning conditions, etc., and it is needless to say further in each approach that suitable spinning conditions etc. can be chosen.

[0011] In order to obtain spun yarn of a gestalt with which a silk fibre encloses the aforementioned artificial fiber in this invention combining the artificial fiber and silk fibre containing a far-infrared radioactivity ingredient For example, the approach of lengthening and arranging two or more silk fibres with the perimeter, twisting these, and making it into piled yarn by using two or more artificial fibers as a core, for example, throwing which consists of two or more artificial fibers, is used as a core. According to the purpose of using yarn, the approach of twisting the staple fiber of silk, while twisting the core which consists two or more silk fibres of a single volume or the approach of carrying out a duplex volume, for example, two or more artificial fibers, to the perimeter etc. can be chosen suitably, and can be used.

[0012] Thus, as compared with usual silk thread, silk, etc., optical allochroic one is improved sharply, without causing yellowing easily, even if the light-fast yarn of manufactured this invention is exposed to sunlight etc. The phenomenon in which the optical allochroic one of such a silk fibre is improved by incorporating the artificial fiber containing a far-infrared radioactivity ingredient Although it completely discovers by chance and such a reason for a manifestation of an operation has now come to be solved while this invention person inquires, it is thought also to the improvement of various ingredients allochroic [ optical ] which has the similarity of the quality of the material besides a natural silk fibre, or structure that there may be applied possibility.

[0013] The improvement effect allochroic [ optical ] in the light-fast yarn of this invention can be used for the various applications which were very remarkable and harnessed the lightfastness. namely, the light-fast yarn of this invention -- as it is -- a strand, although it can knit and can use as yarn, sewing thread, or embroidery yarn Depending on the case, it can also use as cotton etc. as textiles, such as textiles, a pile fabric, knitting, or a nonwoven fabric Furthermore, as secondary elaboration articles, such as yarn and a textile, use for various applications is possible as textiles, such as others, a work of art and handicrafts, various kinds of interior materials, or accessories, etc. [ clothes / various kinds of ]

[0014]

[Example] Hereafter, although an example and the example of a comparison explain this invention concretely, this invention does not receive limitation at all by these publications.

[0015] (Example 1 of reference) Including the titanium-dioxide 40 weight section, the alumina 40 weight section, the zirconia 20 weight section, and the rare earth metal mixed oxide 0.5 weight section, mean particle diameter blended with the Nylon 100 weight section for fiber 2 weight sections of the far-infrared radiation ingredient indicated by the specification which is the Japan patent No. 2137667 which are 0.3 micrometers, and carried out spinning of the 80-denier 24 filament yarn (NF-A) by the melt spinning method. Moreover, the 80-denier 24 filament yarn (NF-B) which does not contain a far-infrared radiation ingredient for a comparison was also prepared.

[0016] (Example) S twist strong throwing (RT-A) of this invention and regular-lay-left-twist strong throwing (LT-A) of this invention were manufactured at 3200 spindle rotational frequencies between 1m, having covered

the silk thread in 21 (SF) which it let out and was obtained from seven domestic silkworm cocoons over NF-A and an eight-dish throwing machine in all. Next, with the tappet type power loom, using SF as warp, two RT-A and two LT-A were driven in by turns as the woof, and the silk crepe-de-Chine cloth (FA) of this invention was created.

[0017] (Example of a comparison) Instead of using NF-A, NF-B which does not contain a far-infrared radiation ingredient was used, and also S twist strong throwing (RT-B) of a contrast article and regular-lay-left-twist strong throwing (LT-B) of a contrast article were manufactured completely like the example. And with the tappet type power loom, RT-B and LT-B were used instead of using RT-A and LT-A, and also the silk crepe-de-Chine cloth (FB) of a contrast article was created completely like the example.

[0018] (Example of a trial) It is JIS about the silk crepe-de-Chine cloth (FA) created in the aforementioned example, and the silk crepe-de-Chine cloth (FB) created in the example of a comparison. L According to the "colorfastness examining method to carbon arc lamp light" indicated by 0842, as it was the following, the change-in-color trial was performed. That is, each test piece cut down from FA and FB and the lightfastness dyed with the blue color put in order and exposed the piece of a benchmark test of standard magnitude (light fastness standard) using fade meter (the Suga Test Instruments make, FAL-H mold), change in color of a test piece, change in color of a light fastness standard, and a naked eye compared, and the light-fast grade was judged. Consequently, to FB of a contrast article having been the 3rd class, the number of FA of this invention is five, and it turned out that it is over the 4th class which is the acceptance standard of the lightfastness of common textiles comfortably.

[0019]

[Effect of the Invention] The light-fast yarn of this invention is what combines and carries out spinning and becomes about the artificial fiber and silk fibre containing a far-infrared radioactivity ingredient so that a silk fibre may enclose an artificial fiber preferably. Since the lightfastness which was excellent over the long period of time is maintained without effectiveness being spoiled by wash etc. in being able to prevent the discoloration by light, especially yellowing effectively, without spoiling the outstanding property which the conventional silk fibre has The silk system textiles which used and carried out secondary elaboration of these yarn and cloth, and obtained them also equip with the similarly excellent lightfastness the cloth and list which were created from light-fast yarn, and there is economical effectiveness that a use life is sharply extensible.

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**LIGHTFAST YARN, LIGHTFAST CLOTH AND LIGHTFAST FIBER PRODUCT**

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**Inventor:** KIKUTA SHUNICHI  
**Applicant:** FUAABEST KK  
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**Abstract of JP2001172835**

**PROBLEM TO BE SOLVED:** To provide a silk-based fiber product equipped with an improved lightfast property, effectively preventing yellowing caused by light without damaging the excellent property of the silk fiber, and enduring its use without reducing its effect for a long period of time. **SOLUTION:** This lightfast yarn is obtained by spinning with combining an artificial fiber containing a far infrared light-irradiating material with the silk fiber, preferably so as to surround the artificial fiber with the silk fiber, and the cloth produced by using the lightfast yarn and the fiber product secondarily processed by using such yarn and cloth also show the same effect.

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(54) 【発明の名称】 耐光性糸、耐光性布、及び耐光性繊維製品

(57) 【要約】

【課題】 絹繊維の有する優れた特性を損なうことなく光による黄変を有効に防止し、しかも長期間にわたって効果が低下することがなくて使用に耐える、改良された耐光性を備えた絹系の繊維製品を提供する。

【解決手段】 本発明の耐光性糸は、遠赤外線放射性材料を含む人造繊維と絹繊維とを、好ましくは絹繊維が人造繊維を取り囲むように、組み合わせて紡績したもので、この耐光性糸を用いて作成した布や、これら糸や布を用いて2次加工した繊維製品も全く同じ効果を示す。

【特許請求の範囲】

【請求項1】 遠赤外線放射性材料を含む人造繊維と絹繊維とを組み合わせる紡績したことを特徴とする耐光性糸。

【請求項2】 前記人造繊維を絹繊維が取り囲むように組み合わせる請求項1に記載の耐光性糸。

【請求項3】 前記人造繊維と絹繊維とを合燃糸してなる請求項2に記載の耐光性糸。

【請求項4】 前記人造繊維の周囲に絹繊維が巻き付くように紡績してなる請求項2に記載の耐光性糸。

【請求項5】 前記人造繊維をコアとした絹繊維によるシングルカバードヤーン、ダブルカバードヤーン、又はコアスパンヤーンのいずれかの構造を有する請求項4に記載の耐光性糸。

【請求項6】 前記人造繊維は、レーヨン系、キュプラ系等の再生繊維、アセテート系、タンパク質系等の半合成繊維、ポリビニルアルコール系、ポリアミド系、ポリ塩化ビニル系、ポリエステル系、ポリアクリロニトリル系、ポリオレフィン系、ポリウレタン系、フェノール系、ポリクラール系等の合成繊維から選ばれたいずれか一種、又はそれ以上の繊維である、請求項1乃至5のいずれかに記載の耐光性糸。

【請求項7】 前記絹繊維は、家蚕系、又は野蚕系の絹繊維である、請求項1乃至6のいずれかに記載の耐光性糸。

【請求項8】 前記請求項1乃至7のいずれかに記載の耐光性糸を、少なくとも材料の一部として用いたことを特徴とする耐光性布。

【請求項9】 前記の耐光性糸を、編み糸又は織り糸として用いた、請求項8に記載の耐光性布。

【請求項10】 前記請求項1乃至7のいずれかに記載の耐光性糸、又は請求項8又は9に記載の耐光性布を、少なくとも材料の一部として用いたことを特徴とする耐光性繊維製品。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、絹繊維を用いて製造される糸、及びその糸を用いて製造される布、並びにこのような糸や布を用いて製造される繊維製品に関するものであり、詳しくは従来から絹の黄変し易いという弱点を解消した、絹系の耐光性繊維製品に関するものである。

【0002】

【従来の技術】絹系の繊維製品は、柔らかくて軽いという特色があり、耐汗性、保温性や保湿性が良いほか、皮膚に対する刺激性が少ないなどの特長が見直されて、衣料や肌着等としての需要が高まってきている。しかしその一方で、太陽光や蛍光灯などの人工光に暴露すると、黄変が進行する欠点があることが知られており、この黄変は、これらの光に含まれる紫外線によって促進される

ことも知られている。

【0003】従来、このような繊維製品自体やそれに用いられる染料などの、紫外線による劣化を防止するために、例えばヒドロキシベンゾフェノン系、ベンゾトリアゾール系、アジリジニル系等の化合物からなる紫外線吸収剤を、アミン化合物等を用いて繊維に結合させる方法や、あらかじめポリエチレングルコール等を含浸させておいた繊維と反応させる方法などが提案されている。しかし、これらの方法は、耐洗濯性が十分でなくて長期の使用に耐えなかったり、風合いを損ねるなどの問題があるため、絹製品に対する紫外線防止方法としては、満足できるものではなかった。

【0004】

【発明が解決しようとする課題】そこで本発明は、絹繊維の有する耐汗性や風合いその他の特性を損なうことなく、有効に黄変を防止し、しかも洗濯等によって効果が低下することがなくて、長期間の使用に耐える、改良された耐光性を備えた絹系の繊維製品を提供することを目的としたものである。

【0005】

【課題を解決するための手段】上記のような本発明の目的は、遠赤外線放射性材料を含む人造繊維と絹繊維とを組み合わせる紡績したことを特徴とする耐光性糸によって、達成することができる。

【0006】そして本発明の耐光性糸は、前記の遠赤外線放射性材料を含む人造繊維を、絹繊維が取り囲むように組み合わせるもので、人造繊維と絹繊維とを合燃糸するか、或いは人造繊維の周囲に絹繊維を巻き付けるように紡績して、人造繊維をコアとした絹繊維によるシングルカバードヤーン、ダブルカバードヤーン、又はコアスパンヤーンのいずれかの構造を有するものとするのが望ましい。

【0007】本発明の耐光性糸における人造繊維は、レーヨン系、キュプラ系等の再生繊維、アセテート系、タンパク質系等の半合成繊維、ポリビニルアルコール系、ポリアミド系、ポリ塩化ビニル系、ポリエステル系、ポリアクリロニトリル系、ポリオレフィン系、ポリウレタン系、フェノール系、ポリクラール系等の合成繊維から選ばれたいずれか一種、又はそれ以上の繊維などであっても良い。

【0008】更にまた、本発明の目的は、前記の耐光性糸を編み糸又は織り糸などの形で、少なくとも材料の一部として用いた耐光性布、そしてこのような耐光性糸、又は耐光性布を、少なくとも材料の一部として用いた耐光性繊維製品によっても、達成することができる。

【0009】

【発明の実施の形態】本発明の耐光性糸の材料として用いられる人造繊維は、上記のように再生繊維、半合成繊維、合成繊維などから選ばれたいずれか一種、又はそれ



以上の繊維であるが、遠赤外線放射性材料を含有しているものであれば、特に限定されことなく利用することができる。そしてこのような人造繊維に含有させる遠赤外線放射性材料は、例えば日本国特許第2137667号の明細書に記載された、公知の遠赤外線放射性材料などを用いることができるが、必ずしもこれに限定されるものではなく、これに類似した遠赤外線放射性を備えており、人造繊維の製造時または製造後に、人造繊維中に含有させることができる材料であれば、利用することができる。

【0010】本発明の耐光性糸の材料として用いられる人造繊維を製造するに当たっては、例えば人造繊維の原料となる高分子材料中に、あらかじめ微粉碎しておいた遠赤外線放射性材料を混合しておき、この遠赤外線放射性材料を含有する高分子材料を紡糸ノズルから押し出し、押し出されたストランドを必要な太さとなるまで延伸する方法などを、利用することができる。しかしながら、このような人造繊維の紡糸方法や紡糸条件等は、それぞれの原料である高分子材料に適した方法を採用し、更にそれぞれの方法において、適切な紡糸条件等を選択することができることは、言うまでもないことである。

【0011】本発明において、遠赤外線放射性材料を含む人造繊維と絹繊維とを組み合わせ、前記の人造繊維を絹繊維が取り囲むような形態の紡績糸を得るには、例えば複数本の人造繊維をコアとして、その周囲に複数本の絹繊維を引き揃え、これらを撚り合わせて合撚糸とする方法、例えば複数本の人造繊維からなる撚糸をコアとして、その周囲に複数本の絹繊維を一重巻き、或いは二重巻きする方法、例えば複数本の人造繊維からなるコアを撚りながら絹の短繊維を巻き付ける方法などを、糸の使用目的に応じて適宜選択して、利用することができる。

【0012】このようにして製造された本発明の耐光性糸は、太陽光等に暴露されても容易に黄変を起こすことなく、通常の絹糸や絹布などと比較して大幅に光変色性が改良されている。こうした絹繊維の光変色性が、遠赤外線放射性材料を含む人造繊維を組み込むことで改善されるという現象は、本発明者が研究に、全く偶然に発見したものであって、このような作用の発現理由は、現在のところ解明されるに至っていないが、天然の絹繊維のほか、材質や構造の類似性を有する各種材料の光変色性の改善に対しても、応用の可能性があり得るものと思われる。

【0013】本発明の耐光性糸における光変色性の改善効果は、極めて顕著であって、その耐光性を活かした種々の用途に利用することができる。すなわち、本発明の耐光性糸は、そのまま織り糸、編み糸、縫い糸、或いは縫い取り糸等として利用することができるが、場合によっては綿などとして利用することもでき、また織物、パイル織物、編み物、或いは不織布などの布帛類等とし

て、更には糸や布帛などの2次加工品として、各種の衣服類のほか、美術品や工芸品類、各種の内装材料、或いは小物等の繊維製品などとして、種々の用途への利用が可能である。

【0014】

【実施例】以下、本発明を実施例及び比較例によって具体的に説明するが、本発明はこれらの記載によって何ら限定を受けるものではない。

【0015】(参考例1) 二酸化チタン40重量部、アルミナ40重量部、ジルコニア20重量部、及び希土類金属混合酸化物0.5重量部を含み、平均粒径が0.3 $\mu$ mの、日本国特許第2137667号の明細書に記載された遠赤外線放射材料の2重量部を、繊維用ナイロン樹脂100重量部に配合し、熔融紡糸法によって、80デニール24フィラメント糸(NF-A)を紡糸した。また、比較のために、遠赤外線放射材料を含まない80デニール24フィラメント糸(NF-B)も用意した。

【0016】(実施例) 家蚕繭7個から繰り出して得た21中絹糸(SF)を、NF-Aと合わせて八丁撚糸機にかけて、1m間のスピンドル回転数3200回で、本発明の右撚り強撚糸(RT-A)と、本発明の左撚り強撚糸(LT-A)とを製造した。次に、タベット式力織機により、経糸としてSFを用い、緯糸としてRT-A 2本とLT-A 2本とを交互に打ち込んで、本発明の絹デシン布(FA)を作成した。

【0017】(比較例) NF-Aを用いる代わりに、遠赤外線放射材料を含まないNF-Bを用いたほかは、実施例と全く同様にして、対照品の右撚り強撚糸(RT-B)と、対照品の左撚り強撚糸(LT-B)とを製造した。そして、タベット式力織機により、RT-AとLT-Aとを用いる代わりにRT-BとLT-Bとを用いたほかは、実施例と全く同様にして、対照品の絹デシン布(FB)を作成した。

【0018】(試験例) 前記の実施例で作成した絹デシン布(FA)と、比較例で作成した絹デシン布(FB)とについて、JIS L 0842に記載された「カーボンアーク灯光に対する染色堅牢度試験法」に準じて、以下のようにして変退色試験を行った。すなわち、フェードメータ(スガ試験機製、FAL-H型)を用い、FAとFBとから切り出したそれぞれの試験片と、青色染料で染めた耐光性が標準等級の基準試験片(ブルースケール)とを並べて露光し、試験片の変退色とブルースケールの変退色と肉眼で比較して、耐光性の等級を判定した。その結果、対照品のFBは3級であったのに対して、本発明のFAは5級であって、一般の繊維製品の耐光性の合格基準である4級を、案に超えていることが分かった。

【0019】

【発明の効果】本発明の耐光性糸は、遠赤外線放射性材料を含む人造繊維と絹繊維とを、好ましくは人造繊維を

絹繊維が取り囲むように組み合わせで紡糸してなるもので、従来の絹繊維の有する優れた特性を損なうことなく光による変色、特に黄変を有効に防止することができるうえ、洗濯などにより効果が損なわれることもなく、長期間にわたって優れた耐光性を維持するので、耐光性糸

から作成された布、並びにこれらの糸や布を用いて2次加工して得た絹系繊維製品も、同様に優れた耐光性を備えており、使用寿命を大幅に延長できるという経済的な効果もある。

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